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AGRO-MORPHOLOGICAL CHARACTERIZATION OF RICE (*ORYZA SATIVA* L.) GENOTYPES BASED ON DUS DESCRIPTORS

Aparna Tandon, Bhawana Sharma, Mangla Parikh and Ritu Ravi Saxena

Department of Genetics and Plant Breeding, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G) 492 012, India

*Corresponding author E-mail: aparnatandon1999@gmail.com

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ABSTRACT

The present investigation was conducted during *Kharif* 2024 at Instructional-cum-Research Farm, Department of Genetics and Plant Breeding, College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, India. The experimental material comprises 187 genotypes of rice including five checks (Swarna, MTU1010, IR64, Dubraj Selaction 1 and C.G Devbhog) were evaluated using Randomized Complete Block Design (RCBD) with two replications for Agro-morphological characterization of 187 genotypes of rice based on 39 DUS characters.

Out of 39 characters under study Leaf: Auricles, Leaf: Collar, Leaf: Ligule, Leaf: Shape of Ligule and Panicle: Number per plant were monomorphic. The dimorphic characters included Leaf: Anthocyanin Colouration, Leaf: Distribution of Anthocyanin Colouration, Leaf Sheath: Anthocyanin Colouration, Leaf: Anthocyanin Colouration of Collar, Stem: Anthocyanin Colouration of Nodes, Panicle: Awns, and Panicle: Presence of Secondary Branching. The polymorphic group included Coleoptile: Colour, Basal Leaf: Sheath Colour, Leaf: Intensity of Green Colour, Leaf Sheath: Intensity of Anthocyanin Colouration, Leaf: Pubescence of Blade Surface, Leaf: Anthocyanin Colouration of Auricles, Leaf: Colour of Ligule, Time of Heading (50% of Plants with Panicles), Spikelet: Colour of Stigma, Stem: Thickness, Stem: Length, Panicle: Length of Main Axis, Flag Leaf: Attitude of Blade (Late Observation), Panicle: Curvature of Main Axis, Lemma and Palea: Colour, Panicle: Colour of Awns (Late Observation), Panicle: Length of Longest Awns, Panicle: Secondary Branching, Panicle: Attitude of Branches, Panicle: Exertion, Leaf: Senescence, Sterile Lemma: Colour, Grain: Weight of 1000 Fully Grown Grains, Grain: Length, Grain: Width, Decorticated Grain: Length and Decorticated Grain: Width.

Keywords: Agro-morphological, characterization, DUS characters, genotypes, rice.

Introduction

Rice is one of the most vital cereal crops globally, serving as the main source of food and energy for nearly half of the world's population. It holds significant nutritional and economic value. Belonging to the genus *Oryza* in the Poaceae family, rice is represented by the species *Oryza sativa*, which has 12 basic chromosomes ($2n=24$). The genus *Oryza* consists of 24 species, including 22 wild types and two cultivated ones *Oryza sativa* and *Oryza glaberrima*. In India, rice cultivation dates back to between 3800 and 2800 B.C. (Seetharaman 2018).

Rice is cultivated globally across approximately 162.76 million hectares. India has the largest area dedicated to rice cultivation in the world, covering

43.86 million hectares. It ranks second in global rice production, producing 99.24 million tonnes with a productivity rate of 2.49 tonnes per hectare, second only to wheat in the country (Ministry of Agriculture, Government of India, 2018-19).

Chhattisgarh is often referred to as the "Rice Bowl of India" due to its significant role in rice cultivation. Rice is grown on approximately 3.67 million hectares, yielding a total production of 6.50 million tonnes with an average productivity of 1,773 kilograms per hectare (Anonymous, 2020).

Rice possesses the largest germplasm collection worldwide. This readily accessible diversity of cultivated varieties, traditional landraces and related wild species has substantially contributed to rice

breeding. These resources play a crucial role in ensuring local food security and promoting sustainable agricultural development while also serving as an invaluable genetic reservoir for rice genetic improvement.

As a signatory to the General Agreement on Tariffs and Trade (GATT), Government of India has established a sui generis system through the Protection of Plant Varieties and Farmers' Rights Act (PPV&FRA), 2001. This Act provides legal protection to plant varieties based on Novelty, Distinctiveness, Uniformity and Stability (DUS) criteria. Consequently, proper characterization of a variety is a fundamental requirement and the identification of plant varieties of common knowledge is essential for safeguarding new plant varieties and assessing varietal purity. The distinctiveness of a variety from existing ones must be demonstrated in accordance with standardized DUS testing guidelines.

Agro-morphological characterization should ultimately result in an organized system for recording and storing valuable data that can be easily retrieved, shared and utilized for effective planning of breeding programmes. Considering the significance of these aspects, the present study was undertaken to characterize 187 rice genotypes.

Materials and Methods

The experimental material was comprised of total 187 rice genotypes i.e. 182 germplasm accessions with 5 checks Swarna, MTU1010, IR64, Dubraj Selaction 1, C.G Devbhog (Table 1) was grown in *Kharif 2024* in Randomized Complete Block Design (RCBD) with two replications. seedlings of each genotype were transplanted manually in 4 rows of 2m length maintaining a spacing of 20cm between rows and 15 cm between plants in each row. Observations were recorded on 5 random plants from each genotype per replication for 39 Agro-morphological characters.

Table 1 : List of rice genotypes used in experiment

S.No	Genotypes	S.No	Genotypes	S.No	Genotypes
1	CGR:487 AJANIYA	35	CGR:1819 BHATA ANJAN	69	CGR:3151 KOLI YARA
2	CGR:547 BARGI	36	CGR:1829 ANJANIYA	70	CGR:3281 BHATA KHUJI
3	CGR:567 LAL BASANT	37	CGR:1834 ANJANIYA	71	CGR:3631 LUCHAI
4	CGR:679 CHIGGI	38	CGR:1935 BANGLA	72	CGR:3653 LUCHAI
5	CGR:789 EB:17	39	CGR:1936 BANGOLI -1	73	CGR:3738 PEELEE LUCHAI
6	CGR:858 BHATHA GURMATIA	40	CGR:1937 BANGOLI -1	74	CGR:3741 PEELEE LUCHAI
7	CGR:859 GURMATIA	41	CGR:1945 BANKAL	75	CGR:3808 MAHUR DHETA
8	CGR:904 JIRA	42	CGR:1946 BANKI	76	CGR:3819 MAUHA KUCHI
9	CGR:1128 LAKHOUWA	43	CGR:1972 DHABLI BANKO	77	CGR:3831 MAKADO
10	CGR:1652 UNKNOWN	44	CGR:1987 LAL BANKO	78	CGR:3863 MALPA
11	CGR:1668 UNKNOWN	45	CGR:1990 MUDI BANKO	79	CGR:3866 MANCHA
12	CGR:1678 AAJAN	46	CGR:1991 RAJ BANKO	80	CGR:4336 PATEL 27 TYPE FOUR
13	CGR:1692 AJAN	47	CGR:1994 SURGUIJHI BANKO	81	CGR:4378 KADAM PHOOL
14	CGR:1709 AJAN LALI	48	CGR:2009 BANSKUPI	82	CGR:4464 RAJNITI
15	CGR:1711 BHATA ANJAN	49	CGR:2010 BANSKUPI	83	CGR:4477 RAMKARONI
16	CGR:1713 BHATA AJAN	50	CGR:2028 BYARANGI	84	CGR:4521 R-70-1
17	CGR:1714 BHATHA AJAN	51	CGR:2050 BARANGI	85	CGR:4971 NA
18	CGR:1720 LALI AJAN	52	CGR:2053 BARANGI	86	CGR:5123 AANJAN (A)
19	CGR:1735 LALI AJAN	53	CGR:2082 BADE BARANGI	87	CGR:5737 BARANGI
20	CGR:1737 AJANIYA	54	CGR:2200 BAWARA HARUNA	88	CGR:5740 BARANGI
21	CGR:1760 BADSHAH BHOG	55	CGR:2257 BHATA MATHURA	89	CGR:5817 MOTI BASMATI
22	CGR:1761 BADSHAH BHOG	56	CGR:2300 BHULAU	90	CGR:5818 BASPAN
23	CGR:1768 BADSHAH BHOG	57	CGR:2370 RAI BUTA	91	CGR:5854 BAUWARA
24	CGR:1795 VISHNU BHOG	58	CGR:2388 URAI BUTA	92	CGR:5897 BHAYA
25	CGR:1803 ANGUR GUCHCHA	59	CGR:2395 URAI BUTA	93	CGR:5941 BHEJARI
26	CGR:1809 ANJAN	60	CGR:2399 URAI BUTA	94	CGR:5988 BHUJANI
27	CGR:1810 ANJAN	61	CGR:2569 GANGA PRASAD	95	CGR:6000 BHUJANIN
28	CGR:1811 ANJANI	62	CGR:2571 GANGA PRASAD	96	CGR:6046 BHUD KUD
29	CGR:1813 ANJAN	63	CGR:2594 GOURI MALA	97	CGR:6261 CHITAR BOTI
30	CGR:1814 ANJAN	64	CGR:2682 GURMATIA	98	CGR:6323 KANAK CHUDI
31	CGR:1815 ANJANIYA	65	CGR:2827 ILAYACHI	99	CGR:6366 CROSS - 116
32	CGR:1816 ANJAN	66	CGR:2876 JHINI PARAS	100	CGR:6416 DESHI SAFRI
33	CGR:1817 ANJAN	67	CGR:2888 JHUMARWA	101	CGR:6644 GADA KHUTA
34	CGR:1818 ANJAN	68	CGR:2947 KAKEDA	102	CGR:6711 GEDREL

103	CGR:7133 JHALER GENDA	132	CGR:7805 KOTARI	161	CGR:8882 PAREWA
104	CGR:7139 JHILI	133	CGR:7807 KOTARI	162	CGR:8945 PARMAL
105	CGR:7142 JHILLI	134	CGR:7812 KRISHNA KOLIYARI	163	CGR:8962 PARMAL
106	CGR:7144 JHILLI	135	CGR:7858 KUSUM KHUTA	164	CGR:9039 LAWANG PHOOL
107	CGR:7159 SON JHILLI	136	CGR:7871 LABEDA	165	CGR:9092 PODISHA
108	CGR:7168 JHILLI PARAGI	137	CGR:7873 LABEDA	166	CGR:9130 RAGHUNATH
109	CGR:7176 JHINGO	138	CGR:7909 LAKHE SAR	167	CGR:9160 RAMESUR
110	CGR:7187 JHUMAKI	139	CGR:7924 LAL HAJARI	168	CGR:9186 RAMTI
111	CGR:7189 JHUNA	140	CGR:7937 LALI ROPA	169	CGR:9281 SAFRI
112	CGR:7192 JHUNNA	141	CGR:8024 LOKTI MACHHI	170	CGR:9622 SULTHU
113	CGR:7193 JHUNNI PRAS	142	CGR:8029 LOKTI MASI	171	CGR:9671 SURMATIA
114	CGR:7209 KALA JIRA	143	CGR:8231 LUDKO	172	CGR:9896 BARONDA OFF TYPE
115	CGR:7210 KANAK JIRA	144	CGR:8409 MALPA	173	CGR:10007 NA
116	CGR:7211 MAIPHAL JIRA	145	CGR:8443 MAN MOHAN	174	CGR:1774 JOGI BHOG
117	CGR:7241 KABARI	146	CGR:8457 MATIA	175	CGR:1812 ANJAN
118	CGR:7306 KAKADIHA	147	CGR:8484 MEHAPAL	176	CGR:2751 NAGPURI GURMATIA
119	CGR:7367 KALI MUNCHH	148	CGR:8495 MEKARA JALA	177	CGR:2264 BHEJARI
120	CGR:7472 KANTH DUDGI	149	CGR:8497 MEKRA JHUNDA	178	CGR:3579 LOHADI
121	CGR:7565 KERA GHUL	150	CGR:8542 MUA	179	CGR:4003 NAGBEL
122	CGR:7593 KEIAKI	151	CGR:8545 MUGDHI	180	CGR:4133 NONGI
123	CGR:7629 KHIRA SAR	152	CGR:8563 MUDARIYA	181	CGR:4909 SURMATIA
124	CGR:7634 KHIRA SAR	153	CGR:8594 MUNDARIA	182	CGR:6042 MOTA BHULAU
125	CGR:7648 KHON JHALO	154	CGR:8630 KANTHI MUNDARIYA	183	SWARNA (CHECK)
126	CGR:7649 KHON JHALO	155	CGR:8679 NAG KESHAR	184	MTU 1010 (CHECK)
127	CGR:7743 KONDI	156	CGR:8687 NAG KESHAR	185	IR 64 (CHECK)
128	CGR:7755 KONDI	157	CGR:8728 NIRGUN	186	DUBRAJ SELACTION 1 (CHECK)
129	CGR:7780 KOSAM GHOL	158	CGR:8745 NIWARI	187	C.G DEVBHOG (CHECK)
130	CGR:7784 KOSARI	159	CGR:8746 NIWARI		
131	CGR:7803 KOTARI	160	CGR:8748 NIWARI		

Results and Discussion

The agro-morphological characterization of rice genotypes revealed considerable variation across seedling, vegetative, reproductive and grain quality traits with clear frequency distributions for each character. Frequency distribution of these characters are presented in Table 2.

Coleoptile colour was predominantly colourless (69.51%), followed by purple (20.32%) and green (10.16%). Basal leaf sheath colour was mainly green (66.84%), while light purple (21.92%) and purple lines (11.22%) were also observed. Leaf green colour intensity was largely medium green (51.33%), dark green (43.31%) and only 5.34% showing light green leaves. Anthocyanin colouration in leaves was absent in most genotypes (75.40%), whereas 24.59% exhibited pigmentation, primarily distributed on leaf margins (97.82%). Leaf sheath anthocyanin colouration was absent in 62.03% of genotypes and present in 37.96%, with intensity ranging from very weak (5.63%) to very strong (32.39%). Leaf blade pubescence was predominantly medium (84.49%) followed by strong (8.55%), weak (4.81%) and absent (2.13%). Auricles, collars and ligules were present in all genotypes (100%). Anthocyanin colouration of auricles was colourless in 63.63%, light purple in

22.99% and purple in 13.36%, while collar pigmentation was absent in 74.86% and present in 25.13%. Ligule colour was mainly white (68.44%) followed by light purple (19.78%) and purple (11.76%) and all genotypes possessed split ligules (100%).

Regarding phenological traits, most genotypes exhibited medium time of heading (91–110 days) accounting for 81.81%, followed by early types (16.04%) and late types (2.13%). Spikelet stigma colour was predominantly yellow (57.21%), purple (36.36%) and white (6.41%). Stem thickness was mostly medium (68.44%), while thin and thick stems constituted 20.85% and 10.69% respectively. Stem length showed wide variation, with long (37.96%) and medium (36.36%) categories being most frequent followed by very long (19.78%). Anthocyanin colouration of stem nodes was largely absent (90.37%).

Panicle traits revealed that long panicles (26–30 cm) were most common (59.89%), followed by medium length (32.08%) and very long panicles (8.02%). Flag leaf attitude was mainly erect (54.54%), semi-erect (19.78%), horizontal (19.25%) and deflexed (6.41%) types also observed. Panicle curvature was predominantly straight (64.17%) and semi-straight (30.48%). All genotypes produced few panicles per plant (100%). Secondary panicle branching was

present in 68.44% of genotypes, with weak (36.36%), strong (23.52%) and clustered (8.55%) branching patterns. Panicle exertion was largely well exerted (85.02%).

Lemma and palea colour showed diversity, though straw colour was most frequent (54.01%), followed by brown furrows on straw (25.13%) and purple colour (12.83%). Awns were absent in 80.21% of genotypes; among awned types, yellowish-white awns predominated (67.56%) and awn length was mostly short (45.94%) to medium (40.54%). Leaf senescence was mainly medium (58.28%), followed by late (31.01%) and early (10.69%). Sterile lemma colour was largely straw (84.49%).

Grain characteristics indicated predominance of medium thousand grain weight (42.24%), followed by

low (33.15%) and high (12.29%) categories. Grain length was mostly short (66.84%) and medium (27.80%), while grain width was narrow (45.98%) to medium (46.52%). Decorticated grains were primarily medium in length (66.31%) and width (71.12%). Overall, the percentage distribution across characters clearly demonstrates substantial agro-morphological diversity among the rice genotypes, emphasizing their value for DUS characterization and rice improvement programmes. The current results are also supported by the findings of Kalyan *et al.*, (2017), Pachauri *et al.*, (2017), Parikh *et al.*, (2012), Manjunatha *et al.* (2018), Sharma *et al.* (2018), Lavanya *et al.* (2021), Singh *et al.* (2021), Mandavi *et al.* (2023), Remme *et al.* (2024).

Table 2 : Frequency distribution data of Agro-morphological characters

S. No.	Characteristic	States	Note	No. of Genotypes	Frequency (%)
1	Coleoptile: Colour	Colorless	1	130	69.51
		Green	2	19	10.16
		Purple	3	38	20.32
2	Basal leaf: Sheath colour	Green	1	125	66.84
		Light purple	2	41	21.92
		Purple lines	3	21	11.22
		Uniform purple	4	0	0
3	Leaf: Intensity of green colour	Light	3	10	5.34
		Medium	5	96	51.33
		Dark	7	81	43.31
4	Leaf: Anthocyanin colouration	Absent	1	141	75.40
		Present	9	46	24.59
5	Leaf: Distribution of anthocyanin colouration	On tips only	1	1	2.17
		On margins only	2	45	97.82
		In blotches only	3	0	0
		Uniform	4	0	0
6	Leaf Sheath: Anthocyanin colouration	Absent	1	116	62.03
		Present	9	71	37.96
7	Leaf sheath: Intensity of anthocyanin colouration	Very weak	1	4	5.63
		Weak	3	15	21.12
		Medium	5	17	23.94
		Strong	7	12	16.90
		Very strong	9	23	32.39
8	Leaf: Pubescence of blade surface	Absent	1	4	2.13
		Weak	3	9	4.81
		Medium	5	158	84.49
		Strong	7	16	8.55
		Very strong	9	0	0
9	Leaf: Auricles	Absent	1	0	0
		Present	9	187	100
10	Leaf: Anthocyanin colouration of auricles	Colourless	1	119	63.63
		Light purple	2	43	22.99
		Purple	3	25	13.36
11	Leaf: Collar	Absent	1	0	0
		Present	9	187	100

12	Leaf: Anthocyanin colouration of collar	Absent	1	140	74.86
		Present	9	47	25.13
13	Leaf: Ligule	Absent	1	0	0
		Present	9	187	100
14	Leaf: Shape of Ligule	Truncate	1	0	0
		Acute	2	0	0
		Split	3	187	100
15	Leaf: Colour of Ligule	White	1	128	68.44
		Light purple	2	37	19.78
		Purple	3	22	11.76
16	Time of heading (50% plants with panicles)	Very early (<71 days)	1	0	0
		Early (71-90 days)	3	30	16.04
		Medium (91-110 days)	5	153	81.81
		Late (111-130 days)	7	4	2.13
		Very late (>131 days)	9	0	0
17	Spikelet: Colour of stigma	White	1	12	6.41
		Light green	2	0	0
		Yellow	3	107	57.21
		Light purple	4	0	0
		Purple	5	68	36.36
18	Stem: Thickness	Thin (0.55 cm)	3	39	20.85
		Medium (0.40-0.55 cm)	5	128	68.44
		Thick (>0.55 cm)	7	20	10.69
19	Stem: Length (excluding panicles; excluding floating rice)	Very short (<50 cm)	1	7	3.74
		Short (91-100 cm)	3	4	2.13
		Medium (111-130 cm)	5	68	36.36
		Long (131-150 cm)	7	71	37.96
		Very long (>150 cm)	9	37	19.78
20	Stem: Anthocyanin colouration of nodes	Absent	1	169	90.37
		Present	9	18	9.62
21	Panicle: length of main axis	Very short (<16 cm)	1	0	0
		Short (16-20 cm)	3	0	0
		Medium (21-25 cm)	5	60	32.08
		Long (26-30 cm)	7	112	59.89
		Very long (>30 cm)	9	15	8.02
22	Flag leaf: Attitude of blade (late observation)	Erect	1	102	54.54
		Semi-erect	3	37	19.78
		Horizontal	5	36	19.25
		Deflexed	7	12	6.41
23	Panicle: Curvature of main axis	Straight	1	120	64.17
		Semi-Straight	3	57	30.48
		Deflexed	5	6	3.20
		Dropping	7	4	2.13
24	Panicle: Number per plant	Few (<11)	3	187	100
		Medium (11-20)	5	0	0
		Many (>20)	7	0	0
25	Lemma and palea: Colour	Straw	1	101	54.01
		Gold and gold furrows on straw background	2	2	1.06
		Brown spots on straw	3	11	5.88
		Brown furrows on straw	4	47	25.13
		Brown (tawny)	5	0	0
		Reddish to light purple	6	0	0
		Purple spots/furrows on straw	7	0	0
		Purple	8	24	12.83
26	Panicle: Awns	Black	9	2	1.06
		Absent	1	150	80.21

		Present	9	37	19.78
27	Panicle: Colour of awns (late observation)	Yellowish white	1	25	67.56
		Yellowish brown	2	0	0
		Brown	3	0	0
		Reddish brown	4	0	0
		Light red	5	0	0
		Red	6	0	0
		Light purple	7	0	0
		Purple	8	8	21.62
		Black	9	4	10.81
28	Panicle: Length of longest awns	Very short	1	4	10.81
		Short	3	17	45.94
		Medium	5	15	40.54
		Long	7	1	2.70
		Very long	9	0	0
29	Panicle: Presence of secondary branching	Absent	1	59	31.55
		Present	9	128	68.44
30	Panicle: Secondary branching	Weak	1	68	36.36
		Strong	2	44	23.52
		Clustered	3	16	8.55
31	Panicle: Attitude of branches	Erect	1	79	42.24
		Erect to semi erect	3	39	20.85
		Semi-erect	5	22	11.76
		Semi erect to spreading	7	13	6.95
		Spreading	9	34	18.18
32	Panicle: Exertion	Partly exerted	3	25	13.36
		Mostly exerted	5	3	1.60
		Well exerted	7	159	85.02
33	Leaf: Senescence	Early	3	20	10.69
		Medium	5	109	58.28
		Late	7	58	31.01
34	Sterile lemma: Colour	Straw	1	158	84.49
		Gold	2	1	0.53
		Red	3	12	6.41
		Purple	4	16	8.55
35	Grain: Weight of 1000 fully grown grains	Very low (<15 g)	1	22	11.76
		Low (15-20 g)	3	62	33.15
		Medium (21-25 g)	5	79	42.24
		High (26-30 g)	7	23	12.29
		Very high (>30 g)	9	1	0.53
36	Grain: Length	Very short (<6.0 mm)	1	10	5.34
		Short (6.1-8.5 mm)	3	125	66.84
		Medium (8.6-10.5 mm)	5	52	27.80
		Long (10.6-12.5 mm)	7	0	0
		Very long (>12.5 mm)	9	0	0
37	Grain: width	Very narrow (<2.0 mm)	1	0	0
		Narrow (2.1-2.5 mm)	3	86	45.98
		Medium (2.6-3.0 mm)	5	87	46.52
		Broad (3.0-3.6 mm)	7	14	7.48
		Very broad (>3.6 mm)	9	0	0
38	Decorticated grain: Length	Short (7.51 mm)	1	59	31.55
		Medium (5.51-6.60 mm)	3	124	66.31
		Long (6.61-7.50 mm)	5	4	2.13
		Extra long (>7.51 mm)	9	0	0
39	Decorticated grain: Width	Narrow (2.5 mm)	3	16	8.55
		Medium (2.0-2.5 mm)	5	133	71.12
		Broad (>2.5 mm)	7	38	20.32

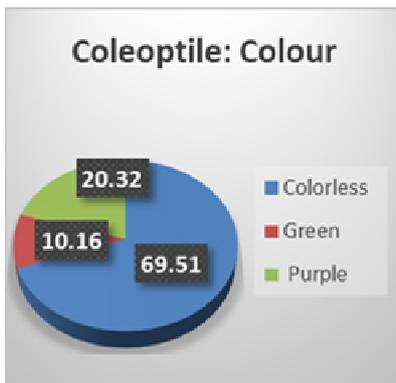


Fig : 1



Fig : 2



Fig : 3

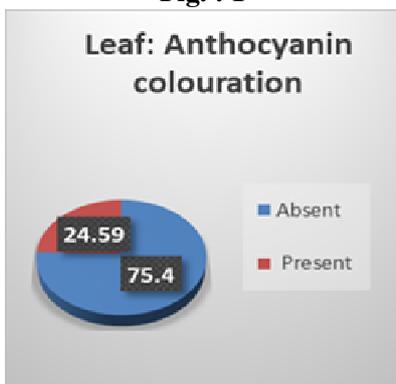


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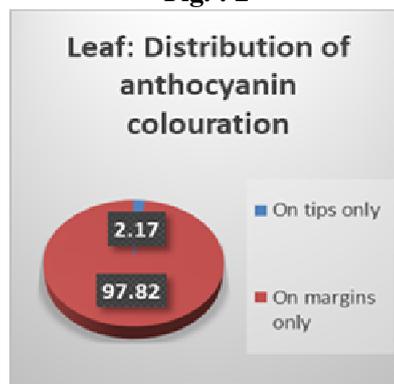


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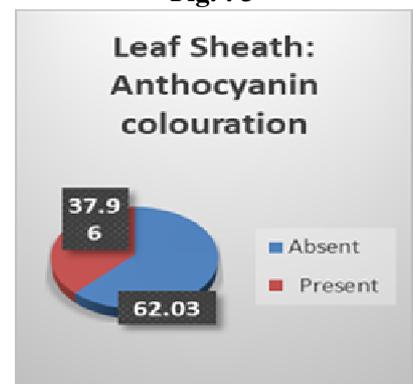


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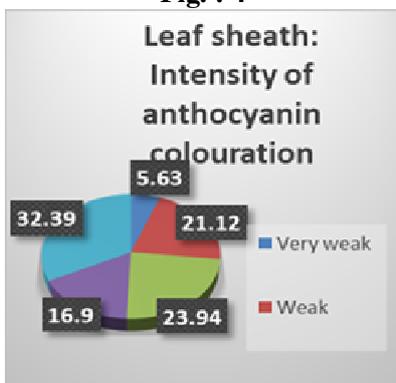


Fig : 7

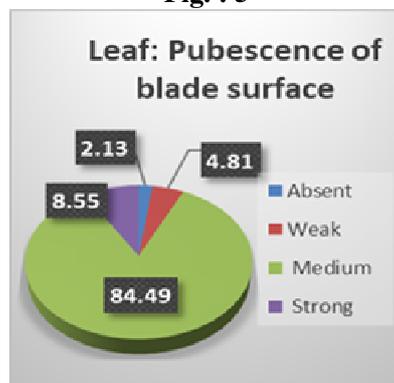


Fig : 8



Fig : 9



Fig : 10



Fig : 11

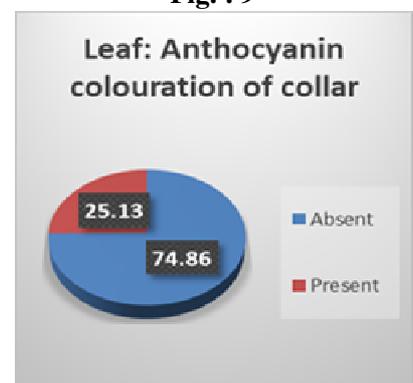


Fig : 12



Fig. : 13



Fig. : 14

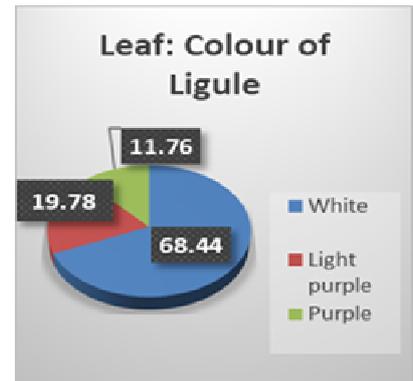


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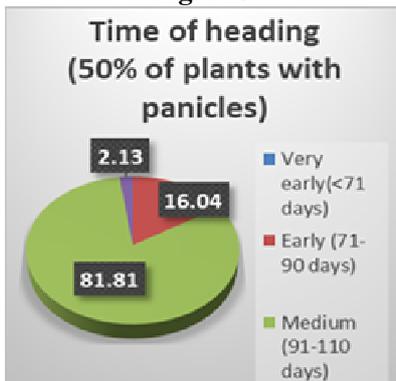


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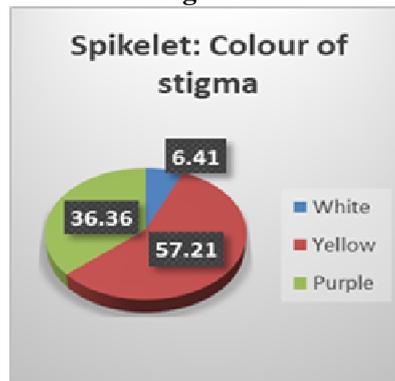


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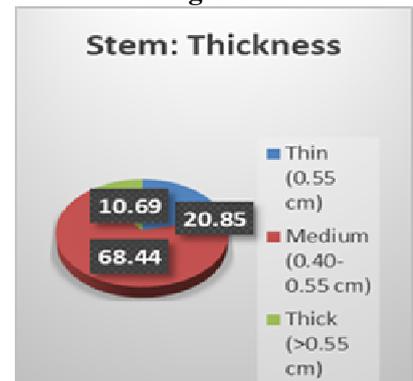


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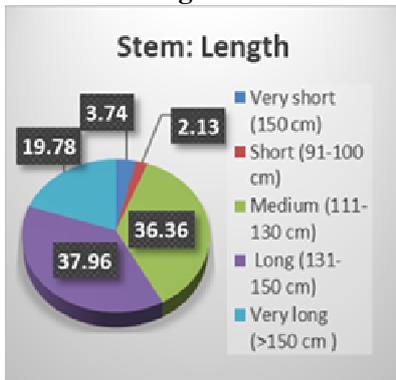


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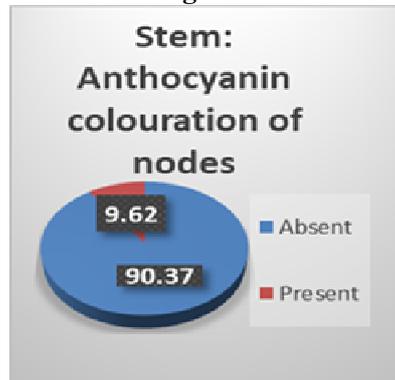


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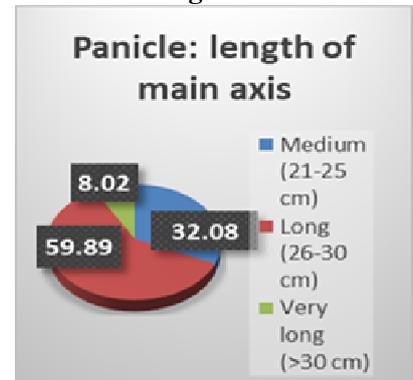


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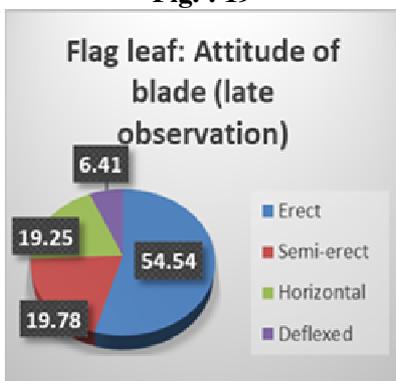


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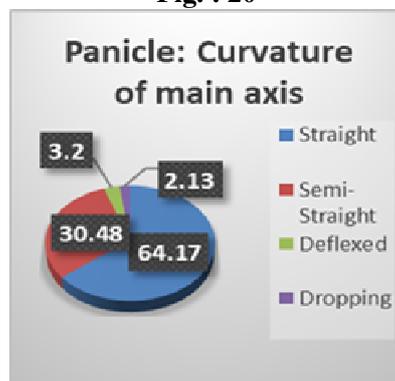


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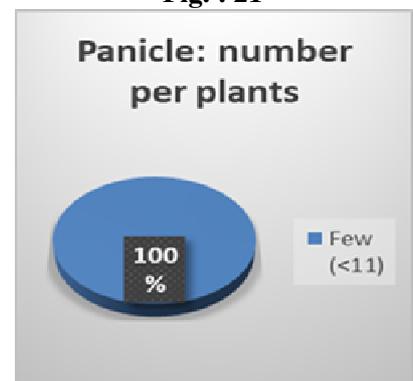


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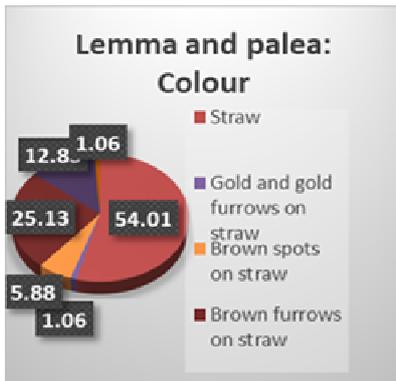


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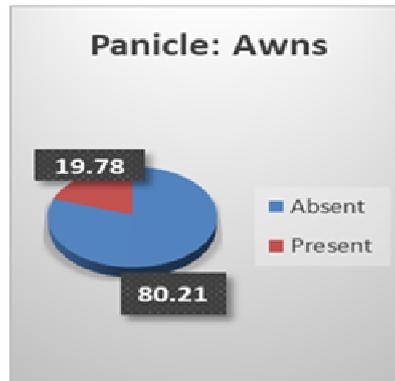


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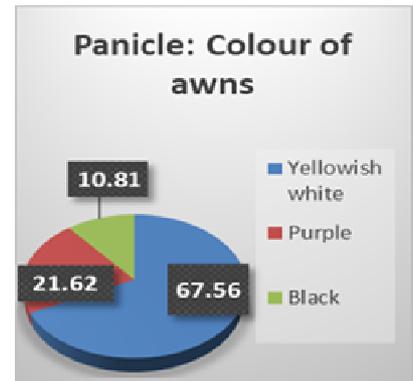


Fig. : 27



Fig. : 28

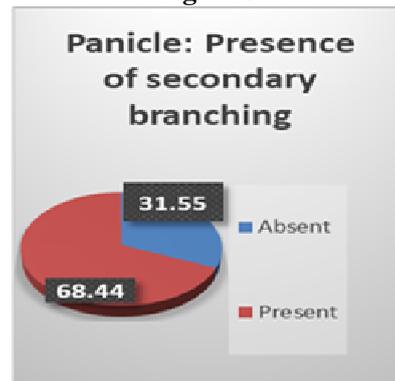


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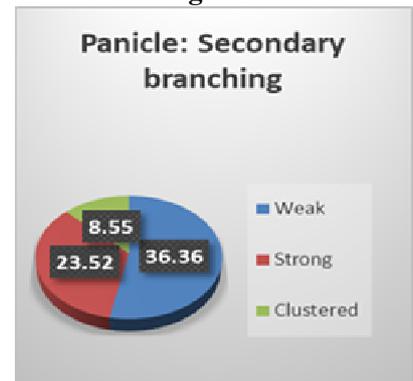


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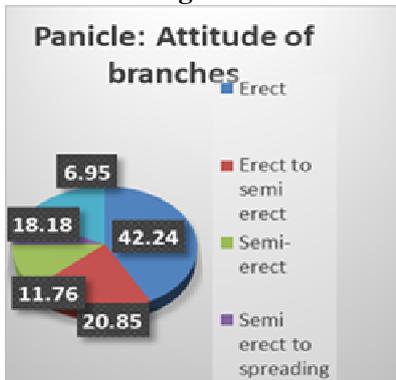


Fig. : 31



Fig. : 32

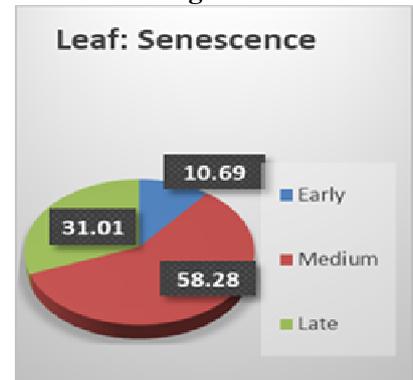


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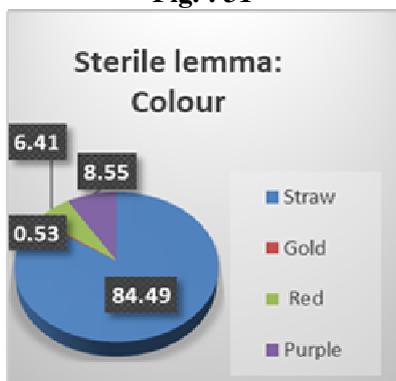


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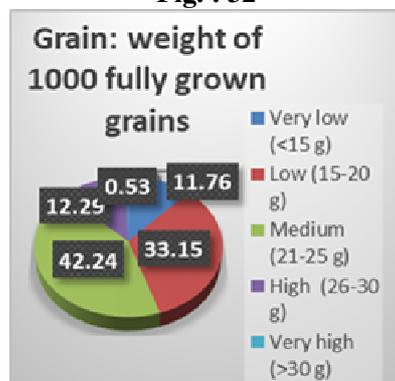


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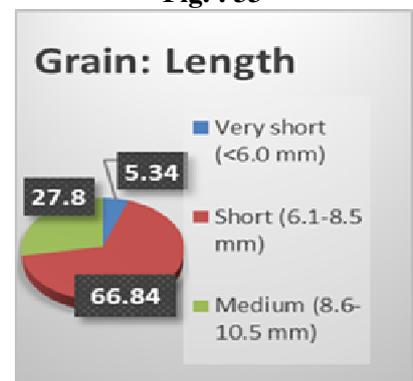


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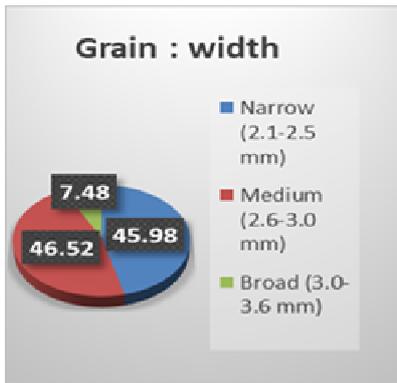


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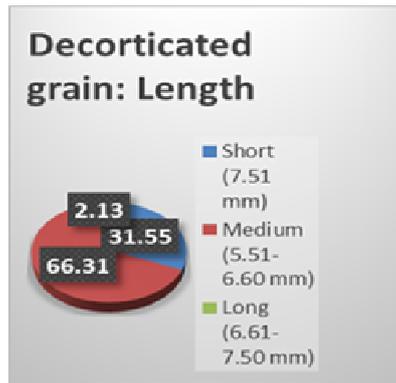


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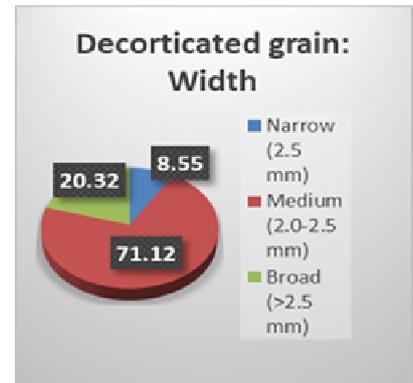


Fig. : 39

Fig. 1 : Frequency distribution of Agro-morphological characters of 187 genotypes of rice



(A) colourless CGR:547



(B) Green CGR:1813



(C) Purple CGR: 487

Fig 2.1 Coleoptile colour



(A) Colourless CGR: 789



(B) Purple CGR: 904



(C) Light purple CGR:679

Fig 2.2 Auricles colour



(A) Clustered CGR:2082

(B) Strong CGR:789

(C) Weak CGR:487

Fig 2.3 Panicle: Secondary branching

(A) Erect CGR: 567



(B) Semi erect CGR: 859



(C) Horizontal CGR: 1128

Fig. 2.4 : Flag leaf: Attitude of blade**Table 3 :** Classification of the Monomorphic, Dimorphic and Polymorphic characters based on study

Monomorphic characters	Dimorphic characters	Polymorphic characters
Leaf: Auricles	Leaf: Anthocyanin colouration	Coleoptile: Colour
Leaf: Collar	Leaf: Distribution of anthocyanin colouration	Basal leaf: Sheath colour
Leaf: Ligule	Leaf Sheath: Anthocyanin colouration	Leaf: Intensity of green colour
Leaf: Shape of Ligule	Leaf: Anthocyanin colouration of collar	Leaf sheath: Intensity of anthocyanin colouration
Panicle: number per plant	Stem: Anthocyanin colouration of nodes	Leaf: Pubescence of blade surface
	Panicle: Awns	Leaf: Anthocyanin colouration of auricles
	Panicle: Presence of secondary branching	Leaf: Colour of Ligule
		Time of heading (50% of plants with panicles)

		Spikelet: Colour of stigma
		Stem: Thickness
		Stem: Length
		Panicle: length of main axis
		Flag leaf: Attitude of blade (late observation)
		Panicle: Curvature of main axis
		Lemma and palea: Colour
		Panicle: Colour of awns (late observation)
		Panicle: Length of longest awns
		Panicle: Secondary branching
		Panicle: Attitude of branches
		Panicle: Exertion
		Leaf: Senescence
		Sterile lemma: Colour
		Grain: weight of 1000 fully grown grains
		Grain: Length
		Grain: width
		Decorticated grain: Length
		Decorticated grain: Width

Conclusions

All the Agro-morphological characters exhibited variation except presence of Leaf: Auricles, Leaf: Collar, Leaf: Ligule, Leaf: Shape of Ligule and Panicle: Number per plant. It is concluded that the characterization has confirmed the presence of distinctness, uniformity and stability for the traits evaluated as per the prescribed guidelines. This information is valuable not only for identifying and utilizing suitable trait-specific donors in breeding programs but also plays a vital role in the registration, maintenance and protection of unique plant materials in the current context.

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